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V.S.

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/022,834 02/13/98 DEGENDT S 98.162

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EXAMINER

AHMED, S

ART UNIT

PAPER NUMBER

1746

DATE MAILED:

02/10/00

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/022,834	Applicant(s) DEGENDT et al.
	Examiner Shamim Ahmed	Group Art Unit 1746

☒ Responsive to communication(s) filed on Nov 26, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 27-50 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 27-50 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 6 & 10

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 27-50 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

3. Claim 27, 34-35, 37-39, 43 and 48 are rejected under 35 U.S.C. 102(b) as being anticipated by Mikio et al (JP 61 004232A).

Mikio et al disclose a cleaning method for removing organic contaminants from a semiconductor substrate, wherein the cleaning fluid comprising ozone, water and acetic acid maintaining the bath temperature in the range of 100-150⁰ C (see pages 3-4).

Mikio et al also disclose the bath temperature is maintain less than the boiling point of the liquid because the boiling point of acetic acid is 116-126⁰ C.

Mikio et al inherently teach that acetic acid is working as a scavenger in the ozonated water, since all the constituents are same in the reaction medium.

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Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 27-28, 30-32, 36,40-42 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mikio et al .

Mikio et al disclose a cleaning method for removing organic contaminants from a semiconductor substrate, wherein the cleaning fluid comprising ozone, water and acetic acid maintaining the bath temperature in the range of 100-150⁰ C (see pages 3-4).

Mikio et al also disclose the bath temperature is maintain less than the boiling point of the liquid because the boiling point of acetic acid is 116-126⁰ C.

With the respect of claims 28, 30-32, 36 and 40- 42 : It would have been obvious to one having ordinary skill in the art at the time of claimed invention to optimize the same, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

6. Claims 27, 29, 33, 44-48 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mikio et al in view of Stanford (USP 5,244,000) and further in view of Kern (Handbook of Semiconductor wafer Cleaning Technology).

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Mikio et al discussed above in paragraph no.5 but fails to disclose the rinsing step of the substrate after cleaning step.

However, Stanford et al. describe a method for removing organic contaminants in which, liquid can be sprayed (col.9, lines 10-13).

Stanford et al. Further describe that after the substrate is treated for removal of contaminants, carbon dioxide is added to deionized water, which is applied to rinse or neutralize the treated substrate (col.7, lines 11-22).

Stanford et al use hydrogen peroxide to remove contaminants but fail to teach ozone is used to remove contaminants from a substrate.

It would have been obvious to one having ordinary skill in the art to replace hydrogen peroxide with ozone because both are functionally equivalent as taught by Mikio et al (see, page 3, first paragraph) and also by Kern (page 52, line 2).

With the respect of the claims limitation 33 and 47: It would have been obvious to one having ordinary skill in the art at the time of claimed invention to incorporate megasonic agitation during cleaning process because it is mostly commonly used particle removal techniques for silicon wafer cleaning as taught by Kern (page 420, paragraph no. 5.3).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Kern and Stanford et al 's teaching into the method for removing contaminants as taught by Mikio et al for effective cleaning process for semiconductor substrate.

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By doing so, one could have a substrate, which is free of organic contaminants and as well as any other impurities.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sehested et al (J. Phys. Chem.) Disclose a method of decomposition of ozone in aqueous solution of acetic acid, wherein acetic acid stabilized the aqueous ozone solution by scavenging of the OH radical (see the introduction, p.1005)
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (703) 305-1929.



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